

coloured plates, all of which were drawn with great care by Mr. P. J. Smit from actual specimens, and are excellent representations of the species they portray. Special interest attaches to the reproductions of radiographs of the skeletons of three mummified baboons, as affording an instance of the author's thoroughness and perseverance. Finding that he could not obtain permission to remove the bandages from the mummies, Dr. Anderson called in the aid of the radiograph, and by this means was enabled in some instances to identify the species to which they belonged.

The mention of baboons reminds us that Dr. Anderson devoted an immense amount of labour and research to the elucidation of the complex synonymy of this puzzling group, and it is satisfactory to find that he has succeeded in clearing up several doubtful points, although others still remain for his successors.

The yellow baboon, commonly known as *Papio babuin*, he has identified with the *Simia cynocephalus* of Linnæus, and the species should consequently in future be known as *Papio cynocephalus*. If we understand him rightly, he regards the Abyssinian thoth baboon (*P. thoth*) as specifically inseparable from the former. Here we may venture to refer to what is, in our opinion, the one fault of the work, namely, its excessive verbosity, whereby it is sometimes by no means easy to arrive at the author's true meaning. A concise summary of conclusions at the end of each description, in which difficult questions are discussed at great length, would have been of inestimable value.

Several other emendations of current nomenclature occur in the course of the work, to a few of which special attention may be directed. For the wild cat of Egypt, commonly known as *Felis maniculata*, the earlier name *F. lybica* (or, correctly, *libyca* or *libica*)¹ is adopted, and it is important to notice that the so-called Kaffir cat of South Africa is regarded as nothing more than a local race of this species, under the name of *F. lybica obscura*. It may be suggested, however, that if this species be, as is commonly supposed, the progenitor of the domesticated cat of Europe, its proper title is *domestica* instead of *libyca*. That the use of a name originally applied to the domesticated representative of a species is not repugnant to the author and editor is proved by their employment of the name *asinus* instead of *taeniopus* for the wild ass of this part of Africa. Another change of more far-reaching import is the replacement of the name *Dipus*, in common use for the jerboas, by the earlier *Jaculus*, this change likewise involving the substitution of the family name *Jaculidæ* for the familiar *Dipodidæ*. Brief references may likewise be made to the replacement of the name *Halicore tabernaculi*, hitherto universally used for the Red Sea dugong, by *H. hemprichi*.

In regard to the nomenclature of the Canidæ, we notice that the fennecs and foxes are separated from the typical genus as *Vulpes*, whereas in a paper on the African members of that group, contributed in 1898 by Mr. de Winton to the Zoological Society's *Proceedings*, both groups are classed as *Canis*. We presume this is

¹ In the case of this species, the author adopts the incorrect spelling of its original describer, whereas the Libyan striped polecat is termed *Ictonyx libyca*.

not a change of front on the part of the editor, but merely a desire not to interfere with the views of the original author.

In an earlier part of this review, we have had occasion to mention that zoology is not a stationary science. An exemplification of this is afforded by the fact that even on its publication the work under consideration is in one small detail out of date. In the text, it is considered that no distinction can be drawn between the northern and southern representatives of the African aard-wolf (*Proteles cristatus*). Mr. Rothschild, in a recent issue of *Novitates Zoologicae*, has shown, however, that three local races of this curious animal are distinguishable, namely, the large and fully striped typical Cape form, the more sparsely striped Angola race and a Somali race.

It may be added, in connection with taxonomy, that the author divides the bats into a much larger number of family groups than is the usual practice of naturalists, making the genus *Noctilio* the type of one family, *Rhinopoma* of a second and *Molossus* of a third.

Regarding the work as a whole, it may be safely said that not only is it an excellent and exhaustive account of the mammals of the area of which it specially treats, but that it is also a most valuable contribution to the study of mammals in general, its value in the broader sense just referred to being partly due to the character of the work itself and partly to the circumstance that Egypt forms a portion of the border-land between the Holarctic and Ethiopian regions, and thus presents a mixed fauna of more than ordinary interest. It is a subject of congratulation to all concerned that the authorities in Egypt have taken great interest in, and have done all in their power to assist the work, which will long remain the standard authority on the subject, and forms, as already stated, a worthy and lasting memorial of its learned and lamented author. R. L.

THE TERPENES.

The Chemistry of the Terpenes. By F. Heusler, Ph.D.
Translated by F. J. Pond, M.A., Ph.D. Pp. xv + 457.
(London: J. and A. Churchill, 1902.) Price 17s. net.

THIS work stands out as a monument to specialisation. A few years ago, the possibility of writing long memoirs upon any one branch of chemistry—especially organic chemistry—would have been out of the question, but to-day we are bombarded right and left with monographs upon this and that branch of chemical science. It is truly remarkable, considering the great array of books upon specialised subjects which are published in Germany, that publishers can be found willing to undertake the risk of bringing them out. But as the writing and publishing of these works goes on with unabated vigour, evidently they must find a sufficient circle of readers to make them a profitable investment, both from the point of view of the author and publisher. One rather wonders how it is that very few books on specialised subjects, which can to any extent be called exhaustive, are published in England. If we desire to study any special branch of science, we are bound either to go to the original publications or to consult foreign compilations

or translations of foreign works upon the subject. And again we may ask, Why is it that so many of the translations hail, not from this side of the water, but from America? The only possible reply seems to be that the scientific Englishman is not fond of writing.

The book under review, which has been translated by Dr. F. J. Pond, assistant professor in the State College of Pennsylvania, is dedicated by its author to Prof. Wallach. We are not surprised at this, because, owing to the careful and splendid experimental work of Prof. Wallach, the chemistry of the terpenes has become systematised and simplified (*i.e.* relatively simplified) in a manner which at one time seemed almost out of the question.

The book commences with an introduction of twelve pages. Naturally, the study of the camphors or oxidised compounds of the terpenes could not be left out of any work which dealt with the terpenes. Dr. Heusler explains that

"Japan camphor, while closely allied to the terpenes, has such an extremely large number of derivatives that an exhaustive description of them would demand as large a space as the derivatives of all the remaining members of the terpene group taken together."

Therefore Dr. Heusler only mentions those which are most closely related to the members of the terpene group. But at the same time, it would have been both interesting and instructive if he had seen his way—perhaps in the form of an appendix—to give a summarised discussion of some of the controversial points under consideration in the camphor problem. As it is, he only gives Bredt's formula for camphor and passes over the others, as he considers that the present state of our knowledge is scarcely sufficient to allow of criticism. If we take down the British Association notes for 1900 and study Dr. Lapworth's very able report upon the camphor question, we see that it is possible to summarise shortly the camphor literature in a lucid and satisfactory manner.

Under the heading "Hemiterpenes," there is a short description of isoprene and some of its derivatives. The connection of such vegetable products as guttapercha and the terpenes is noteworthy, isoprene being of special interest, since when acted upon by concentrated hydrochloric acid it polymerises into a rubber-like substance. On the other hand, isoprene, along with other substances, is produced when the vapour of turpentine is passed through a red-hot tube.

We then come to the study of the terpenes proper; this portion of the book occupies nearly one hundred pages. Naturally, pinene, the chief ingredient of turpentine oil and the most widely distributed of the terpenes, is first studied. Under each terpene, the preparation and properties are first given, and then their behaviour towards oxidising agents and various reagents.

Following the terpenes, we come, on p. 133, to the study of the oxidised compounds; this is divided into two parts—(1) Substances which cannot be regarded as derivatives of the hydrocymenes, analogues of pinene, camphene and fenchene; (2) substances which may be regarded as derivatives of the hydrocymenes. Camphor, which falls under the first category, is first discussed, and here again Bredt's formulæ for camphor, camphoric and

camphoronic acid are given. The study of the olefinic members of the terpene series follows on p. 377; the first portion is devoted to the study of the hydrocarbons and the second part to the oxygenated compounds, such as linalool, geraniol, the pleasant-smelling constituent of Turkish and German oil of rose and citronellol. The last twenty pages are devoted to the study of the sesqui- and poly-terpenes.

Taking the book as a whole, it will be found to be a very interesting review of some of the most important work which has been carried out in connection with the chemistry of this very abstruse but exceedingly interesting branch of chemical science. At times there is a tendency to lapse into a "dictionary" style of writing, but it should be borne in mind that descriptive writing is of all writing the most difficult. The book should be of great value to all those who are engaged upon the study of the terpenes or of camphor, but when this work of 450 pages has been carefully studied, it will still be found necessary to consult the original literature. Fortunately, Dr. Heusler has given fairly full references, and for this he cannot be too highly commended.

The book can hardly be recommended to the general student, because he would be apt to lose himself in a maze of compounds a previous knowledge of which is taken for granted.

Dr. F. J. Pond has evidently taken great pains in translating the book, and he certainly deserves a word of thanks for his trouble.

F. MOLLWO PERKIN.

EXPERIMENTAL PHONETICS.

The Elements of Experimental Phonetics. By Edward Wheeler Scripture. Pp. xvi + 627; 26 plates and 348 illustrations. (New York: C. Scribner's Sons; London: Edward Arnold, 1902.)

THIS handsome volume is one of a series of books issued by a number of the professors and instructors of Yale University in connection with the bicentennial anniversary of that institution. It is an effort to collect and arrange the data at present available concerning the voice in song and speech, and it is enriched by an account of much valuable work done in the field of experimental phonetics by the author himself.

During the last decade, the science of phonetics has made rapid progress, more especially in France, Germany, America and Scandinavia; it has now a nomenclature and methods of its own, and it is cultivated with much earnestness and ability by many workers, some of whom are a singular combination of physicist, physiologist and philologist. The scope of the science is a study of the physical, physiological and psychical phenomena connected with language. It deals with the physical basis of the sounds of language, with the physiological mechanisms by which these sounds are produced, with the cerebral phenomena connected with the psychical processes that lie at the root of the nervous mechanisms by which ideas find expression in articulate sounds, and with the laws of emphasis and of rhythm.

In this work, Dr. Scripture surveys the whole field. He first of all deals with the physical aspect of the subject in a series of sections on the curves of speech—that is